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PERENNIAL TUMBLEWEEDS.

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Tumbleweeds may be classified under three general heads:

Annual tumbleweeds,
Tumble-grasses,
Perennial tumbleweeds.

The annual tumbleweeds are mostly plants with a small root system which shrivels up or rots away soon after the seed has matured. The plants are then easily torn from the ground or broken off and go tumbling away before the wind. In some cases the roots become quite fleshy and brittle. In the tumble-grasses the panicle is generally the only part which is transported, the stems of the panicle being usually very brittle and breaking readily even in those forms which are easily torn up from the roots.

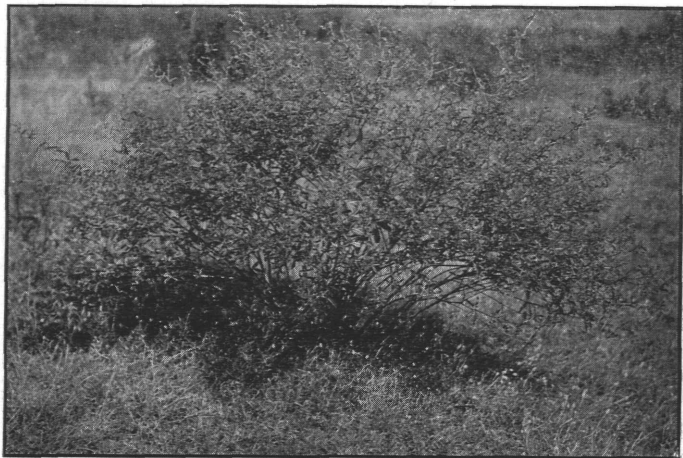


Fig. 1. *Psoralea floribunda*. Plant growing on prairie, Clay Co., Kan.

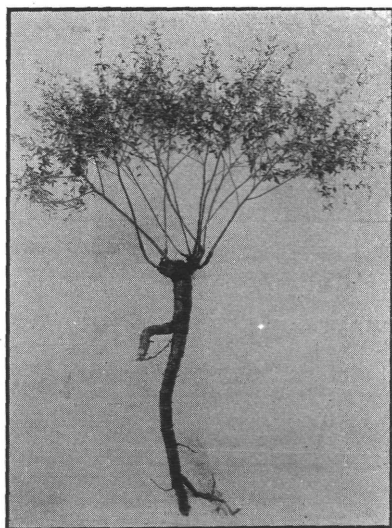


Fig 2. Plant of *P. floribunda*, showing a part of the deep taproot.

The perennial tumbleweeds are especially interesting because of the way in which they are separated from the underground parts. Among the perennial forms *Psoralea floribunda* is one of the most typical. It is a longlived, perennial crown-former with a very deep root which may be several inches in diameter. From the short terminal stem of this root a number of aerial branches are developed annually. These branches take on a more or less globose or balloon-shaped form. At the base of each aerial stem a number of special joints are formed in which transverse cleavage regions are gradually developed, and when the seed is

ripe the whole crown breaks off at these joints with remarkable ease. This is a peculiar case of the development of a self-pruning process in the stem for a very special purpose.

Psoralea argophylla also develops perfect joints but fewer shoots usually make up the crown and it is therefore less conspicuous than *P. floribunda*. *Psoralea esculenta* is also a tumbleweed but the writer has not made an examination of the way in which it separates from the thick, tuberous, perennial root.

Psoralea floribunda is very abundant in north-central Kansas where the writer has seen great masses heaped up against hedges and wire fences. These plants show a most remarkable responsive adaption to an environment of very definite conditions. They have developed nearly every character possible in harmony with the dry and windy plains of the west and may be regarded as ideal prairie plants.

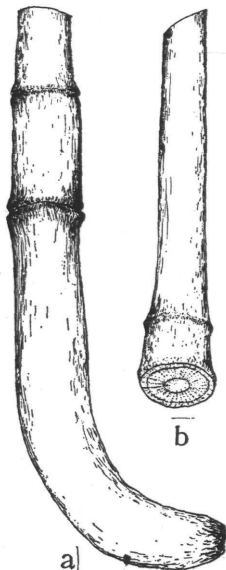


Fig. 3. (a) Base of a stem of *P. floribunda* with two cleavage joints. (b) Base of stem showing cleavage surface.